UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
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F/SER47:PW

SEP 25 2014

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426-0001

Re: Aguirre Offshore GasPort, LLC, CP13-193-000 and PF12-4-000 FERC/EIS-0253 Draft Environmental Impact Statement dated August 2014

Dear Ms. Bose:

Thank you for providing the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) the opportunity to review and comment on the Draft Environmental Impact Statement (DEIS) for the Aguirre Offshore GasPort Project dated August 2014 (docket number CP13-193-000 and PF12-4-000). According to the DEIS, the project would include the construction and operation of an offshore marine liquefied natural gas (LNG) receiving facility (Offshore GasPort) and a 4.1-mile-long subsea pipeline connecting the Offshore GasPort to the Aguirre Plant in Salinas, Puerto Rico. The LNG receiving facility would be located in the Caribbean Sea, in approximately 63 feet of water, approximately three miles offshore and one mile outside of Jobos Bay near the towns of Salinas and Guayama, Puerto Rico.

These comments address issues related to the Magnuson-Stevens Fishery Conservation and Management Act (MSA), Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA) and the National Environmental Policy Act (NEPA). The enclosed comments and recommendations are intended to further the consultation processes of the ESA, satisfy our commenting requirements under the MSA, and ensure a full analysis is conducted under NEPA.

If there are questions on MSA issues, please contact Dr. Pace Wilber at (843) 762-8601. For questions related to the ESA or MMPA, please contact Ms. Rachel Sweeney at (727) 551-5743.

Sincerely,

Miles M Croom

for Roy E. Crabtree, Ph.D.
Regional Administrator

Enclosure

Cc: F/SER - Keys
F/SER2 – Steele
F/SER3 – Bernhart
F/SER4 - Fay
PPI-NEPA
NMFS HQ NEPA-Leathery

NOAA's National Marine Fisheries Service
Comments and Recommendations on
Aguirre Offshore GasPort Project Draft Environmental Impact Statement

NOAA's National Marine Fisheries Service (NMFS) offers comments on the proposed Aguirre Offshore GasPort Project pursuant to the National Environmental Policy Act (NEPA), the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), the Endangered Species Act (ESA), and the Marine Mammal Protection Act (MMPA). The purpose of the Aguirre project is to provide liquefied natural gas (LNG) storage capacity and sustained delivery of natural gas directly to the Aguirre Plant, facilitating the Puerto Rico Electric Power Authority's conversion of the Aguirre Plant to a dual-fuel generation facility.
NMFS is using the *Aguirre Offshore GasPort Project Draft Environmental Impact Statement* (DEIS), dated August 2014, to (1) recommend improvements for the Final Environmental Impact Statement (FEIS), (2) provide the Federal Energy Regulatory Commission (FERC) with essential fish habitat (EFH) conservation recommendations, and (3) identify additional information needed to further the ESA consultation.

National Environmental Policy Act (40 C.F.R. §1503.2)

The National Environmental Policy Act (NEPA) directs federal agencies to comment on draft environmental impact statements when the federal agency has jurisdiction by law or special expertise with respect to any environmental impact resulting from an agency action, such as the authorization by the FERC of the Aguirre Offshore GasPort. As described below, the comments from NMFS under NEPA focus on the project description, alternatives analysis, and general adequacy of the impact estimates for larval fishes and corals.

Description of the Proposed Action

Aguirre Offshore GasPort, LLC (AOG), proposes to construct and operate an LNG port facility in the Caribbean Sea in 63 feet of water approximately three miles offshore and one mile outside of Jobos Bay near the towns of Salinas and Guayama, Puerto Rico. A floating storage and regasification unit (FSRU) vessel measuring 291 meters long with a draft of 11.6 meters would be permanently moored to the offshore platform. The FSRU vessel would only be moved during large storms when it is determined conditions would be unsafe for the FSRU vessel to remain moored to the platform or when the FSRU vessel requires dry dock maintenance, which AOG estimates to be every five years. When the FSRU vessel is in drydock, AOG anticipates another FSRU vessel would moor to the platform to maintain LNG operations. The platform would have two LNG vessel berths with fenders and mooring and breasting dolphins as well as utility platforms with docking for life boat and service vessels. LNG Carriers (LNGCs) would dock at the GasPort and deliver LNG to the FSRU vessel. The LNGCs would be present at the platform 183 days of the year (assuming 50 deliveries per year with a stay of 88 hours per delivery as presented in the DEIS).

A 4.1-mile-long, 18-inch outside diameter steel pipeline with an additional 3-inch concrete coating subsea pipeline would connect the GasPort to the Aguirre Plant. As proposed, construction of the pipeline and offshore terminal would impact approximately 116 acres of seafloor during construction. Temporary impacts associated with construction of the offshore terminal would affect 4.1 acres of coral habitat and 71.4 acres of seagrass. Temporary impacts

associated with construction of the pipeline would affect 1.1 acres of coral habitat and 5.3 acres of macroalgae and seagrass. A push-pull-lay technique would be used to install the pipeline with no burial proposed, which would temporarily impact an additional 20.5 acres of macroalgae and seagrass. This installation technique would result in creation of 2-foot wide berms on either side of the pipeline, which are not accounted for in the estimates of permanent impacts to seagrass in the DEIS. Permanent impacts include 0.2 acre of coral habitat in the area of the terminal, which is likely an underestimate as it assumes shading would not affect coral health; 0.3 acre of coral habitat from the pipeline, which assumes there would be no temperature impacts from the pipeline; 22.1 acres of seagrass in the area of the terminal; and 1.6 acres of seagrass along the pipeline, which does not account for the impacts from creation of berms along the pipeline that could affect the seagrass growth.

The offshore berthing platform would be a fixed platform supporting topside facilities and two vessel berths, one on each side of the platform. The platform would be designed for long-term mooring of an FSRU vessel and for berthing LNGCs. The FSRU vessel would be moored at a berth on the northern (landward) side of the platform, and the LNGCs would temporarily dock on the southern (seaward) side of the platform while unloading LNG. LNG would be transferred from the LNGCs to the FSRU vessel for storage. AOG would utilize one of Excelerate Energy's existing Energy Bridge Regasification Vessels (EBRVs) as the FSRU vessel. EBRVs are LNG tankers with onboard equipment for the vaporization of LNG and delivery of natural gas.

According to information in the DEIS, only the FSRU vessel and LNGCs would have operation-related seawater withdrawals. However, the estimates in the DEIS do not take into consideration the existing seawater withdrawals and discharges currently associated with the operation of the Aguirre Plant and the cumulative impacts of these discharges on marine resources. The normal seawater use by the FSRU vessel would total approximately 56 million gallons per day (MGD), including 53 MGD to support machinery cooling through operation of the main condenser and auxiliary seawater cooling systems, 0.6 MGD to generate the vessel's water safety curtain, 2 MGD for ballast water, and 0.2 MGD for the marine growth preventative system. All seawater used to support FSRU vessel operations would be drawn through four sea chests on the sides of the vessel, located approximately 22.8 feet and 37.4 feet below the ocean surface. Under normal water use, the calculated through-screen velocity of water entering the sea chests would be approximately 0.45 feet per second, which is just below the upper velocity threshold of 0.5 feet per second recommended to minimize entrainment and impingement of aquatic organisms[1]. All of the water used for these purposes would be discharged back into the surrounding ocean. The DEIS states the FSRU vessel's seawater uptake would represent a negligible volume of seawater relative to the surrounding ocean; i.e., the 56 MGD total withdrawal volume approximately represents a section of the Caribbean Sea measuring 195 feet by 195 feet by 195 feet.

LNGCs unloading product would also require cooling water for engines to generate electrical power for the offloading pumps and other onboard systems. Ship engines would be operated while docked, so LNGCs would need cooling water during the entire time they are moored at the facility (estimated at 41 to 88 hours). LNGCs would require between 17.2 to 74.2 million gallons of seawater for ballast while offloading product at the GasPort. Total cooling water intake volume would range from approximately 13.5 to 227.8 million gallons during LNG delivery. The combined seawater intake for ballast and cooling water for each LNG delivery

[1] http://water.epa.gov/lawsregs/lawsguidance/cwa/316b/

would range from approximately 31 to 302 million gallons. Seawater intake depths for the LNGCs were not specified in the DEIS; however, the DEIS states seawater uptake by LNGCs would represent a negligible volume of water relative to the surrounding sea; i.e., the maximum 302 million gallons required for ballast and cooling water approximately represents a section of the Caribbean Sea measuring 340 feet by 340 feet by 340 feet.

The proposed GasPort would also discharge heated water with a maximum temperature of 106.2 degrees Fahrenheit. This is in addition to the heated water already discharged to Jobos Bay from operation of the Aguirre Plant. Whether or not the seawater intake and water discharge associated with the existing plant would be altered to compensate for the thermal discharges from proposed GasPort is not discussed in the DEIS; such discussion should be included in the project description section of the FEIS.

Alternatives Analysis

Alternative Land-based Locations for the GasPort and Pipeline

The DEIS discussion of alternative locations for the GasPort and pipeline is incomplete, omitting reasonable alternatives. For example, the DEIS states EcoElectrica would not be a feasible alternative location for the LNG facility because approximately 31 acres would be needed to create new facilities; however, NMFS notes the EcoElectrica location already includes 36 acres identified for LNG storage. In addition, the location of the previously proposed Gasoducto del Sur pipeline has been evaluated by the federal regulatory agencies, including NMFS, and found to have minimal impacts to NOAA trust resources[2]. The project was awarded federal and local permits, suggesting it would likely be a feasible and available alternative. Use of the existing EcoElectrica facilities, with the addition of another storage tank, and construction of the Gasoducto del Sur pipeline to the Aguirre plant, with adjustments to the proposed pipeline route to address residents' concerns, would have no impacts to marine resources other than increased vessel traffic to the existing EcoElectrica pier. NMFS recommends this alternative be more fully evaluated in the FEIS.

Alternative Offshore Locations for the GasPort and Pipeline

Several alternate pipeline routes are presented in the DEIS, although the majority would pass through the Boca del Infierno as would the preferred route, which would result in the most temporary and permanent impacts to coral resources. Based on a review of the information in the DEIS, NMFS recommends a more thorough analysis of Terminal Site 4 and Pipeline Route 3, which would eliminate the majority of impacts to seagrass. This alternative would also reduce coral impacts because the benthic surveys indicate the pass between Cayo Morrillo and Cayos de Pajaros contain less coral and a sand channel where the pipeline could be placed between reef areas. The site of the terminal could also be moved seaward in order to address concerns related to the distance from the terminal to the cays versus the safety zone the U.S. Coast Guard will likely require. The DEIS indicates temporary impacts to coral habitat from this route would be greater; however, the DEIS also includes information suggesting a lesser extent of coral in Pipeline Route 3 and no coral in Terminal Site 4. Additionally, this alternative would

[2] NMFS acknowledges concerns were raised regarding proximity of the pipeline to local residences; however, NMFS believes these concerns may be addressed by rerouting the pipeline.

significantly reduce permanent impacts to coral habitat in part because there are no coral resources in the area where the terminal would be located.

Alternatives Construction Methods for the Pipeline

NMFS recommends the FEIS analyze in detail the alternative of using horizontal directional drilling (HDD) to pass the pipeline under the dense seagrass areas within the bay and under the coral habitat both at Boca del Infierno and at the crossing between Cayo Morrillo and Cayos de Pajaros (for the analysis of Terminal Site 4 and Pipeline Route 3). This analysis should include details of all temporary and permanent impacts to NOAA trust resources and measures that would be employed to minimize these impacts during construction and operation of the project.

Another construction alternative that should be considered in the FEIS is trenching the pipeline in areas with dense seagrass in order to reestablish the original site contours and eliminate the probability that the pipeline will serve as a barrier to movement of queen conch. As for the other alternative terminal sites and pipeline routes, a thorough analysis of all temporary and permanent impacts to NOAA trust resources associated with this alternative installation method should be conducted. The trenching of the pipeline in seagrass should also be analyzed in conjunction with the use of HDD in areas containing corals to determine whether the permanent impacts to essential fish habitat (EFH) and species protected under the Endangered Species Act (ESA) would be less in the long-term from installation methods other than the push-pull, direct lay currently presented as the preferred alternative.

Alternative Technologies for Regasification

The DEIS describes LNG vaporization alternatives to be used aboard LNGCs and FSRU vessels at the GasPort. In summary, AGO proposes use of a closed-loop vaporization system to regasify LNG prior to offloading, requiring use of 56 and 81.6 MGD of seawater for the FRSU vessel and LNGCs, respectively. From NMFS experience reviewing similar LNG deepwater ports proposed in Florida, NMFS believes anticipated seawater consumption for Aguirre GasPort's LNGCs and FSRU vessels is unnecessarily high. For example, the Calypso LNG (Calypso) project off the east coast of Florida had proposed use of a similar, closed-loop vaporization system aboard special regasification ships (SRS) moored at one of two buoys. The Calypso SRS were to include a system capable of vaporizing LNG in a closed-loop system and cooling the electricity-generating engines. The Calypso SRS also were to include an open-loop mode used when LNG is not being vaporized, and a closed-loop mode not requiring any seawater intake. Further, the Port Dolphin Deepwater Port LNG project proposed off the west coast of Florida would utilize up to two Shuttle and Regasification Vessels (SRV), each requiring 9.5 MGD of seawater for LNG regasification operations. An additional 2.3 MGD of ballast seawater would also be required during SRV off-loading, requiring approximately 21.3 MGD for regasification activities aboard the two SRVs.

NMFS recommends the FEIS include discussion and evaluation of entirely closed-loop LNG vaporization alternatives, which use a small portion of LNG to effectively heat and regasify LNG for offloading. Further, additional discussion is warranted on why the lower seawater volume regasification technologies proposed for Calypso and Port Dolphin are not suitable for the Aguirre Offshore GasPort.

General Comments on the Adequacy of Impact Estimations for Larval Fishes and Corals

A primary concern of NMFS is with the estimates of impact to zooplankton populations from routine GasPort operations. Given the size, complexity, and cost of the project, the level of sampling effort invested to determine impacts on zooplankton was inadequate. This is particularly the case for fish and invertebrate larvae, an essential component of the meroplankton and a component that is highly variable in time and space. Estimates of impacts, including data used to calibrate the model which guides a more general assessment of impacts, are based upon short-term sampling efforts conducted quarterly within a single year. The likelihood of capturing event-driven zooplankton patches is low to almost non-existent under this sampling scenario. For example, if a slick of coral larvae comes within reach of an intake point, mortality could considerably exceed predictions. It is understood that sampling was conducted to specifically capture coral spawning events, but this sampling does not appear to have been particularly successful and may not be representative of the more general situation. Moreover, if the operation turns out to be located within a hydrodynamically defined transport corridor, mortality impacts could be chronic and substantial. The fact that a 300-micron-mesh net was used also creates concern, because that mesh size is too large to capture the larvae of many invertebrate species (especially molluscs) even at their most advanced stage of development. A final concern is the common misconception expressed in the DEIS that mortality rates of marine larvae are very high; this must be tempered by the understanding that many eggs are never fertilized. Although egg production rates are very high in both fish and invertebrates, implying the eggs are expendable, the reality is that once successful fertilization is accomplished, the embryo and successive stages become much more valuable contributors to future generations. Thus, the conclusions drawn regarding impacts to zooplankton, particularly larval fish and invertebrates, cannot be accepted with confidence and it remains unclear whether the impacts from entrainment truly will be minor. Because fish and invertebrates are essential components of the ecology and socio-economics of coral reef ecosystems and the human communities they support, this inadequacy in sampling and interpretation is of considerable concern.

To rectify this situation at this late date, and to ensure impacts to zooplankton are minor as claimed, a monitoring program needs to be established and continued, ideally using presently available continuous recording devices, to obtain the data necessary to fully understand the impacts within a proper environmental context. This monitoring program should be continuous for the life of the GasPort operation. An integral aspect of the monitoring program should be a mitigation requirement that provides compensation to the local communities for foregone socioeconomic opportunities. It is clear from the DEIS that such foregone opportunities will occur, so it's just a matter of ensuring those lost opportunities are properly accounted for and addressed.

An additional concern is the physical structure of the platform will serve to provide attractive habitat for reef fish, potentially including Nassau and goliath grouper. This is a common occurrence on oil rigs and there's no reason not to expect similar outcomes on the GasPort platform. Increased densities of these species may result in increased negative interactions with the operation, including through impingement, but it appears no consideration at all was given to assessing the possible implications of such interactions. This too needs to be addressed.

Summary of Recommendations for the Project Description and Alternatives Analysis

1. Additional detail is needed in the FEIS for alternative vaporization technologies, especially with respect to comparisons of environmental impacts and environmental costs from alternative closed-loop vaporization technologies.

2. The FEIS should include additional discussion and analysis of anticipated coral larvae and ichthyoplankton impacts potentially affected by subsea and surface current anomalies in the project area. In addition, the analysis should identify trends in abundance, distribution, and seasonal timing of coral larvae and ichthyoplankton in the project area resulting from subsea and surface currents. NMFS believes ichthyoplankton entrainment impact estimates in the DEIS are underestimated and additional ichthyoplankton sampling data are necessary to utilize correctly the methodology NMFS and the U.S. Coast Guard developed for examining entrainment[3].

3. The FEIS should include a breakout of the expected volumes and rates of seawater used by the number and type of diesel engine(s) specifically required for propulsion, LNG vaporization, and hotel services of LNCGs and FSRU vessels while moored at the GasPort. Seawater intake depth(s) aboard LNGCs should be specified.

Magnuson-Stevens Fishery Conservation and Management Act (16 U. S. C. SS 1801 et seq.) related comments:

In addition to informal comments during interagency meetings and public scoping meetings, NMFS, Southeast Region, Habitat Conservation Division staff participated in and provided FERC and U. S. Army Corps of Engineers (USACE) comments and recommendations on the Aguirre Offshore GasPort as follows:

1. FERC Open Houses, February 2012, September 2012, and May 2013.
2. FERC Scoping Meetings, March 2012, May 2012, September 2012, May 2013, November 2013, and June 2014.
3. FERC Notice of Intent dated February 28, 2012.
4. USACE public notice October 2013.

DEIS Appendix F is an EFH assessment describing EFH and federally managed fisheries within the area of the proposed Aguirre Offshore GasPort. The EFH descriptions (seagrass, macroalgae, coral, coral reef, sand/shell bottom, and water column) and fishery species listed are adequate for this consultation and do not require augmentation. DEIS Appendix E is an analysis of entrainment impacts to fishery species and complements the EFH assessment. On page F-25, FERC concludes the Aguirre Offshore GasPort "would result in adverse impacts on coral reef, seagrass, and benthic algae EFH, and Magnuson-Stevens Act- managed coral and queen conch species due to an anticipated reduction in the abundance and health of corals, seagrass, and algae in the immediate footprint of the proposed offshore terminal and subsea pipeline." As noted later in these comments, NMFS agrees with FERC's determination and EFH conservation recommendations are provided.

[3] NMFS generally supports AOG's evaluation of entrainment impacts using the methodology NMFS and the U.S. Coast Guard developed for evaluating the Gulf Landing deepwater port in the Gulf of Mexico (the Environmental Impact Statement for that project describes the method in detail). As noted in the comments, NMFS is concerned insufficient seasonal ichthyoplankton sampling has reduced the reliability of the model's results.

In addition to the DEIS, NMFS has reviewed the following supplemental documents and is providing comments on the adequacy of the coral larvae and ichthyoplankton field sampling activities and recommendations to more accurately quantify impact estimates, and minimize those impacts to living marine resources resulting from GasPort operations:

(1) Aguirre Offshore GasPort, LLC, CP13-193-000, *Estimation of Potential Coral Larvae Entrainment*, dated January 24, 2014

(2) Aguirre Offshore GasPort, LLC, CP13-193-000, *Entrainment and Equivalent Loss Impact Interim Report*, dated February 7, 2014

(3) Aguirre Offshore GasPort, LLC, CP13-193-000, *Fall 2013 – Baseline Entrainment Characterization Data Update*, dated March 26, 2014

(4) Aguirre Offshore GasPort, LLC, CP13-193-000, *Entrainment and Equivalent Adult Loss Impact Report, Final Report – Annual Data*, dated April 16, 2014.

Coral Larvae Entrainment Impacts

Estimation of Potential Coral Larvae Entrainment describes coral larvae presence and abundance from plankton tows conducted August 20 through 28, 2013, to coincide with the anticipated August 2013 spawning event predicted to occur following the full moon on August 21, 2013. The objective of the sampling event was to provide site specific data on coral larvae densities in the vicinity of the proposed GasPort during periods of spawning activity. Sampling was conducted using a 0.75-meter bongo net fitted with a 300-micrometer conical plankton net, flow meter, and 300-micrometer plankton bucket. Sampling targeted water depths of 23 to 36 feet to match the anticipated depth range of the FSRU vessel sea chests where larvae would be prone to entrainment. Proposed GasPort construction and operations would occur over benthic habitat consisting primarily of coarse sand and low density corals. Information in the document states a concentrated area of coral reefs supporting a variety of coral, including species protected under the ESA, is found near Boca del Infierno approximately one mile east of the proposed GasPort. The report states only coral larvae at the depth of the FSRU vessel intakes (23 feet and 36 feet) would be potentially entrained, and recently-spawned gametes at the water surface are not at risk of entrainment. As noted earlier, LNGC seawater intake depths were not specified in the DEIS and assumed to be similar to the FSRU vessel.

The DEIS states studies on the density of coral larvae in the area of the proposed GasPort could not be identified, nor could historic site-specific densities of coral larvae in the waters surrounding Puerto Rico be found. Consequently, AOG used surface coral larvae sampling activities conducted in Kaneohe Bay, Hawaii (Hodgson 1985), and six-meter-depth coral-larvae sampling studies near the inner reefs of the Great Barrier Reef (Oliver and Willis 1987, Willis and Oliver 1988, Oliver et al. 1992) for evaluating potential impacts from the Aguirre GasPort. The Hodgson study shows approximately 1,000 to 10,000 larvae per 100 cubic meters at peak spawning and 0.4 larvae per 100 cubic meters at other times. Conversely, Oliver et al. (1992) observed 10,000 to 1,000,000 larvae per 100 cubic meters during peak spawning events.

Applying the results from the Hawaii and Great Barrier Reef studies, AOG assumes larval density at the Aguirre FSRU vessel intake depths is likely to be approximately three orders of magnitude less than near surface densities. AOG further estimates coral larva densities of approximately 0.4 larvae per 100 cubic meters during non-spawning periods and 10 to 100 larvae per 100 cubic meters just after a peak spawning event.

Coral larvae entrainment impacts were estimated based on the expected seawater use of the FSRU vessel and LNGCs at the proposed GasPort. The applicant used observed minimum (daytime) and maximum (nighttime) coral larvae densities to estimate anticipated coral larvae entrainment. Assuming a continuously operating FSRU vessel and LNGCs, which utilize 55.96 MGD and a maximum 81.6 MGD of seawater daily, respectively, daily entrainment of coral larvae based on the collected data would result in daily entrainment impacts of 571,412 and 833,231 coral larvae respectively, per vessel, during the coral spawning period (Table 1). Based upon the field sampling results, DEIS Table 4.5.4-7 indicates estimated annual coral larvae entrainment losses would be 11.4 million and 10.6 million individuals for the FSRU vessel and LNGCs, respectively. A longer larval duration in the water column would increase the entrainment estimate and likewise a shorter larval duration stage would reduce these estimates. Based upon these impact estimates, information in the DEIS states entrainment of coral larvae would likely result in a permanent, moderate impact on coral populations in the region.

Table 1. Maximum Daily Entrainment Estimates for Coral Larvae at the GasPort Location based on intake volume (cubic meters, m^3) and number of coral larvae (#/m^3).

Intake Water Source	Daily Operating Intake Volume (m^3)	Daytime Coral Larvae Density (#/m^3)	Nighttime Coral Larvae Density (#/m^3)	Maximum Daily Entrainment Estimate
FSRU vessel	211,230	0.085	5.31	571,412
LNGCs	308,890	0.085	5.31	833,231

Ichthyoplankton Entrainment Impacts

Entrainment and Equivalent Adult Loss Impact Report Final Report – Annual Data and DEIS Appendix E indicate ichthyoplankton presence and abundance was assessed using plankton tows at the proposed GasPort location by four seasonal sampling events between May 2012 and November 2013. During each season (May 2012, March 2013, August 2013 and November 2013), four transects were sampled during a single daytime event and a single nighttime event. Ichthyoplankton were sampled from all depths across the four transects using a 0.75-meter-diameter, 300-micrometer-mesh bongo net. Results were used to provide a preliminary estimate of the annual ichthyoplankton entrainment impact in terms of equivalent adult losses (EAL) using a methodology NMFS and the U.S. Coast Guard developed for evaluating impacts of ichthyoplankton at deepwater ports. The method assumes all pelagic eggs and larvae in the intake water would be entrained and suffer mortality. Potential entrainment losses to eggs and larvae for a species or group due to GasPort operational intakes (FSRU vessel continuous operation and LNGC deliveries at 12, 24, and 50 deliveries per year) were estimated by multiplying the total volume of water use by the estimated number of eggs and larvae per unit volume based on the applicant's ichthyoplankton seasonal sampling events. These egg and larval densities are thought to represent the vertical mean for the water column, as oblique

sampling tows were performed. The maximum intake volumes used to estimate entrainment for the FSRU vessels and LNGCs are 55.96 MGD and 81.6 MGD, respectively[4].

Assessments for specific species or taxa of concern that serve as indicators of the potential entrainment impacts of the project included: *Lutjanidae* (snappers), *Serranidae* (groupers and sea basses), *Carangidae* (jacks), *Haemulidae* (grunts), *Palinuridae* (spiny lobster), fish eggs (not identified to family), all unidentified and other fish larvae, and all other invertebrate larvae. Relatively high abundances of fish eggs were collected during the winter, spring, and summer sampling at the proposed GasPort, and could be a result of alongshore transport of eggs from coastal reefs and pelagic waters in and around Boca del Infierno and from adjacent seagrasses serving as spawning habitat for many fishes. The fish egg densities were particularly high during the summer sampling event, potentially as a result of the lunar spawning activities of serranids, sciaenids, and other common fish species in Puerto Rican waters (Sale 1993). The average egg densities were 169, 401, 1,475, and 96 eggs per 100 cubic meters during the winter, spring, summer, and fall samplings, respectively.

Results of the winter, spring, summer, and fall ichthyoplankton sampling activities are summarized DEIS Table 4.5.4-5 and Table 4.5.4-6. Discussion in the DEIS of entrainment impacts on commercial and recreational fisheries focuses on the Family Lutjanidae (snappers) because this group is the most commonly harvested taxa in Puerto Rico (Matos-Caraballo 2007, NOAA 2013). Commercial landings of snappers from Puerto Rico averaged 486,488 pounds annually between 2004 and 2006 (Matos-Caraballo 2007). Recreational landings of snapper from Puerto Rico averaged approximately 87,906 pounds annually between 2010 and 2012 (NOAA 2013). Total pounds per equivalent adult were calculated using the assumption that mean weight of an individual snapper at harvestable size is one pound (Migdalski and Fichter 1976). Approximately 229 pounds of snapper were estimated to have been lost to entrainment at the FSRU vessel during a year, equivalent to less than 0.05% of the total commercial annual landings and 0.26% of the total recreational annual landings in Puerto Rico. Approximately 41, 81, and 169 pounds of snapper were estimated to have been lost to entrainment at the LNGCs during a year, for the 12, 24, and 50 delivery scenarios, respectively, equivalent to less than 0.01 to 0.04% of the total commercial annual landings and 0.05 to 0.19% of the total recreational annual landings in Puerto Rico.

Based on the results of the ichthyoplankton entrainment analysis, the DEIS states calculated annual EAL fish and invertebrates would be relatively low. However, these entrainment estimates need to be used with the caveat that they are only based on four one-day seasonal sampling events to derive fish and invertebrate plankton densities. Based on the information available, the DEIS states GasPort operations would result in a permanent, minor impact on fish and shellfish populations in the region due to entrainment. The loss of planktonic fish and shellfish due to entrainment would also result in a reduction in food availability for fish and invertebrates species which prey on these species.

[4] The normal water use requirements of the FSRU vessel would be approximately 55.96 MGD of seawater intake, operated continuously and year-round. Seawater use of LNGCs is variable, depending on the actual vessel used for delivery, and is unknown at this time. However, the maximum intake volume for the LNGCs is estimated to be 81.6 MGD during offloading operations, which includes 88 hours of moorage at the berthing location.

NMFS Concerns with the Coral Larvae and Ichthyoplankton Sampling

NMFS believes the limited plankton sampling data used to calculate entrainment impacts has resulted in underestimates of these impacts. The DEIS notes the value of the plankton density data collected is limited for use in an entrainment analyses because the sampling only occurred over the course of four days, one day to represent each season. NMFS agrees this is a significant shortcoming. NMFS believes additional coral larvae sampling activities are necessary to provide multiple, long-term presence/abundance data to be used to estimate entrainment impacts on this resource. Further, NMFS recommends a comprehensive, long-term coral larvae and ichthyoplankton monitoring program be developed as a project component designed to: (1) more accurately identify seasonal and annual variations of fish and invertebrate planktonic resources at the GasPort site, (2) determine potential cumulative impacts on these resources to identify ichthyoplankton impacts from GasPort operation, and (3) develop adaptive management mitigation options to further reduce such impacts.

The proposed GasPort would be constructed approximately one mile west of the Boca del Infierno coral communities and Jobos Bay; information in the DEIS states oceanic currents flow east to west along the southern coast of Puerto Rico. However, scientific literature reviews or field sampling activities documenting in situ oceanic currents at the project site were not cited in the document. NMFS recommends information detailing seasonal and annual currents at the site flow east to west, how the currents were determined, and whether the current direction and velocity is consistent throughout the water column. Furthermore, because information in the DEIS indicates coral communities exist at Boca del Infierno approximately one mile east of the proposed GasPort site and currents flow east to west, coral larval transport from those communities would be carried to the GasPort site. Information in the coral larval sampling report does not indicate whether current studies have been conducted at these sites. The presence of coral near the proposed GasPort location increases the likelihood for coral larvae entrainment impacts.

Further, from our review of NOAA Chart 25687, it appears the GasPort would be constructed on a slightly shallower bathymetric feature than adjacent water depths. Consequently, this feature may influence benthic currents to flow upward towards the intakes on the FSRU vessel and LNGCs and result in more coral larvae entrainment impacts than estimated by AOG. To help evaluate oceanic currents throughout the entire water column at these sites, NMFS recommends seasonal acoustic Doppler current profiler (ADCP) surveys be conducted at the proposed GasPort site to identify surface, mid-column, and benthic currents. The results of ADCP surveys may be used to provide additional information with regard to the areal extent of coral larval transport mechanisms from the Boca del Infierno (and other) coral communities.

Because AOG is proposing to place the GasPort into service in 2016, NMFS recommends a minimum two-year pre-project baseline ichthyoplankton survey be developed and coordinated with state and federal natural resource agencies to determine existing, site-specific, year-round characteristics of the ichthyoplankton resources present at the GasPort site. Because the GasPort may be operational in approximately two years, pre-project ichthyoplankton data collection should begin as soon as possible, be performed throughout the year, and may be conducted concurrent with GasPort and pipeline construction. Acquired data can then be used to quantitatively assess potential impacts of port operation on identified fishery resources and, if

determined necessary, adaptive management mitigation options to further reduce such impacts could be implemented.

Mitigation for Entrainment Impacts to Coral Larvae and Ichthyoplankton

Once a thorough analysis of the recommended additional future coral larvae and ichthyoplankton entrainment impacts has been completed utilizing the two-year baseline data to be collected prior to GasPort operation, NMFS recommends mitigative measures be developed and implemented to ensure that unavoidable entrainment impacts are fully offset. The mitigation plan should be linked to an adaptive management plan for the GasPort that would identify and require operational or mechanical modifications to minimize entrainment impacts. The mitigation plan should consider using hatcheries to replace lost fishes and invertebrates, and monitoring should be done within the sea chests to determine the amount of mitigation needed.

EFH Conservation Recommendations

NMFS concludes the Aguirre Offshore GasPort, as proposed in the DEIS, would adversely impact EFH. Section 305(b)(4)(A) of the Magnuson-Stevens Act requires NMFS to provide EFH conservation recommendations when an activity is expected to adversely impact EFH. Based on this requirement, NMFS provides the following:

EFH Conservation Recommendations

1. Alternative vaporization technologies shall be evaluated to determine if they offer a practicable means to reduce the amount of water consumed and entrainment of fishery species.

2. Horizontal directional drilling and trenching shall be evaluated as means for installing the pipeline in areas with high densities of seagrass and corals.

3. At least two years of baseline data shall be developed to determine existing, site specific, year-round characteristics of the fish and invertebrate plankton resources present at the site of the terminal. Data collection should begin as soon as possible, be conducted concurrent with port and pipeline construction, and continue to perpetuity for the life of the LNG terminal. Acquired data can then be used to quantitatively assess potential impacts of port operations on identified fishery resources and, if determined necessary, to develop and implement adaptive management mitigation options to further reduce such impacts.

4. A compensatory mitigation plan for impacts to EFH shall be developed by AOG and approved by NMFS before FERC issues its license for the GasPort. The planned mitigation shall fully offset all permanent and temporary impacts to coral, hardbottom, microalgae beds, and seagrass. The plan also shall have intermediate and long-term success criteria and an adaptive management and monitoring program for gauging performance with respect to the success criteria. Failures to meet interim success criteria may result in additional compensatory mitigation being required.

Please be advised that the Magnuson-Stevens Act and the regulation to implement the EFH provisions (50 CFR Section 600.920) require the FERC to provide a written response to this letter. That response must be provided within 30 days and at least 10 days prior to final agency

action. A preliminary response is acceptable if final action cannot be completed within 30 days. The FERC's final response must include a description of measures to be required to avoid, mitigate, or offset the adverse impacts of the activity. If the FERC's response is inconsistent with these EFH conservation recommendations, the FERC must provide an explanation of the reasons for not implementing the recommendation.

Endangered Species Act (16 U.S.C. §§ 1531 et seq.) and Marine Mammal Protection Act (16 U.S.C. §§ 1361 et seq.) related comments:

NMFS Protected Resources Division staff previously participated in and provided FERC and the USACE comments and recommendations on the Aguirre Offshore GasPort as follows:

1. Commented on FERC Notice of Intent dated February 28, 2012.
2. Meetings and calls with FERC September 20, 2012, March 25, 2013, and July 17, 2014.
3. Interagency meetings February 6, 2013, July 9, 2013, November 6, 2013, February 10, 2014, and August 6, 2014.
4. USACE public notices October 1, 2013, and August 15, 2014.
5. Sent comment letter regarding draft Biological Assessment (BA) October 31, 2013.
6. Received DEIS and consultation initiation request letter from FERC via email August 18, 2014.

Below are recommendations from NMFS regarding the ESA and a summary of additional information required for the ESA Section 7 consultation for the project. NMFS will be providing a formal request for additional information in response to FERC's letter of August 14, 2014, which transmitted the Biological Assessment and requested the initiation of consultation.

Although not detailed below, the NMFS Protected Resources Division also shares the concerns and echoes the recommendations provided by the Sustainable Fisheries and Habitat Conservation Divisions related to the potential project impacts of entrainment on larval forms of ESA-listed and proposed species, including corals and Nassau grouper. Because our concerns related to entrainment were adequately addressed earlier in this letter, NMFS will list below only the concerns not previously addressed and those specific to ESA-listed species.

The DEIS indicates direct impacts to marine mammals not listed under the ESA but protected under the MMPA are not contemplated as part of the project. However, the DEIS acknowledges that collisions with marine mammals could occur associated with the FSRU vessel when it is away from the platform or LNGCs in transit to and from the platform. If any non-ESA-listed marine mammals may be adversely affected by the proposed action, a take authorization under the MMPA may be necessary. Please contact NMFS's Protected Resources headquarters office at 301-427-8400 or visit http://www.nmfs.noaa.gov/pr/laws/mmpa/ for more information regarding MMPA requirements.

ESA-listed species under our purview that occur in the project area include green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), loggerhead (*Caretta caretta*), and leatherback sea turtles (*Dermochelys coriacea*). ESA-listed whale species, blue (*Balaenoptera musculus*), finback (*B. physalus*), sei (*B. borealis*), humpback (*Megaptera novaeangliae*), and sperm whales (*Physeter macrocephalus*), may be located in the area of the proposed offshore GasPort, as well as along transit corridors for vessels during both construction and operation of the facility.

NMFS previously requested that surveys to assess the presence of ESA-listed sea turtles and whales in the project area be performed, and the DEIS indicates that surveys have been completed, but our records show that these were not dedicated or targeted surveys but rather anecdotal observations of sea turtles and marine mammals during benthic surveys. The information provided in the DEIS for whale species is mainly from a 1986 report, and sea turtle information is anecdotal based on observations during benthic surveys completed for the project. Reiterating our previous request of October 31, 2013, NMFS recommends that dedicated surveys to assess the presence of ESA-listed sea turtles and whales in the project area be performed to fully inform the assessment of potential effects.

Reefs and hardgrounds meeting the coral critical habitat definition[5] are present in the project area, as are ESA-listed elkhorn (*Acropora palmata*) and staghorn (*Acropora cervicornis)* coral colonies. On August 27, 2014, NMFS issued a final rule responding to a petition to list an additional 82 species of corals, including seven species of Atlantic corals. As a result, five Atlantic coral species are newly listed as threatened: *Orbicella* (formerly *Montastraea*) *annularis*, *O. faveolata*, *O. franks*i, *Dendrogyra cylindris*, and *Mycetophyllia ferox*). Information in the benthic surveys completed for the preferred pipeline route and platform location indicate that all of these species are within the project area, though no estimates are provided regarding the numbers of colonies of each of these species to be impacted by the proposed project. The FEIS and Biological Assessment should be revised to reflect the change in coral listing status as well as to fully assess the potential effects of the proposed activity on all ESA resources.

NMFS is currently in the process of evaluating and listing other species under the ESA and recommends the FEIS be revised to include information to assess potential impacts as appropriate. NMFS published a proposed rule to list Nassau grouper (*Epinephelus striatus*) as threatened on September 2, 2014. Nassau grouper are found in the project area and, based on information in the DEIS (including information collected during ichthyoplankton sampling completed for the project), this species may be impacted by seawater intakes associated with the project through entrainment. The species may also be directly impacted by impingement should larger individuals (greater than larval size) congregate near the seawater intakes at the platform. Additional impacts to Nassau grouper may occur resulting from potential loss of food sources from reductions in plankton concentrations associated with entrainment due to operation of the facility in conjunction with the existing Aguirre plant seawater intake in the bay. NMFS published a final listing rule for the scalloped hammerhead shark (*Sphyrna lewini*) on July 3, 2014, to list the Central and Southwest Atlantic Distinct Population Segment (where Puerto Rico is located) as threatened. No information regarding the presence or absence of this species in the project area was provided in the DEIS. NMFS also began a status review for queen conch (*Strombus gigas*) in response to a petition received from WildEarth Guardians in February 2012 to list this species as threatened or endangered and designate critical habitat. The DEIS notes that this species may be affected by the proposed push-pull installation technique for the pipeline, which will result in the creation of a berm around the pipeline in coarse sandy sediments such as where the dense seagrass beds and conch populations are common along the pipeline route. Queen conchs were observed in seagrass beds in the bay and at the proposed platform location during benthic surveys. NMFS recommends the document be revised to assess

[5] The essential feature of critical habitat for listed corals is substrate of suitable quality and availability, in water depths from the mean high water line to 30 m, to support successful larval settlement, recruitment, and reattachment of fragments. Substrate of suitable quality and availability means consolidated hardbottom or dead coral skeletons free from fleshy macroalgae and sediment cover.

the potential effects of the pipeline and associated berm on queen conch migration. The FEIS and Biological Assessment should be revised to reflect the change in listing status for Nassau grouper and scalloped hammerhead shark, if data for the project area indicate that this shark species could be affected by the project.

Additional Information Requested for ESA Section 7 Consultation

Based on review of the information in the DEIS and Biological Assessment included in DEIS Appendix D, NMFS believes most of the concerns expressed in its October 31, 2013, letter regarding the draft BA prepared for the project remain unaddressed. Specifically, adequate detail regarding all potential temporary and permanent project impacts during construction and operation of the project to ESA-listed species and their habitat still need to be provided, including quantification of impacts. Details of proposed avoidance and minimization measures for impacts also need to be provided in order for us to determine the extent of project impacts, both temporary and permanent, to our trust resources. There are numerous statements in the DEIS regarding the effects determinations and extent of project impacts to ESA resources that note minor, short-term impacts or moderate, long-term impacts, but the document lacks objective information (e.g., data sources, site surveys, calculations) to support those conclusions.

As described above, NMFS will be providing a formal request for additional information (RAI) in response to your letter of August 14, 2014, which transmitted the Biological Assessment and requested the initiation of consultation. Issues that will be address in that RAI include:

1. Sightings and stranding data for sea turtles and marine mammals, including data from recent scientific literature and other sources to provide estimates of the population of ESA-listed sea turtles and marine mammals within the action area. In October 2013, NMFS requested that surveys be conducted of the construction and operation areas for the preferred and alternative routes and that such surveys use methods approved by NMFS. The DEIS indicates that these surveys were conducted, but NMFS has no record of reviewing or approving the survey protocols or the results of the surveys.

2. Details of the acoustic analysis for both sea turtles and marine mammals, including methodology used to calculate potential impacts based on the number of piles, hammer strikes, size of piles, etc. There is general information regarding an acoustic analysis in the DEIS and Biological Assessment, but no details were provided, including details of the size and type of the pilings, the length of time needed to drive them, and other information that is essential for estimating the potential extent of behavioral and injurious impacts.

3. Vessel strike data for the project area, including from the operation of fuel barges currently used to supply the power plant and from similar LNG projects; this information is needed to estimate potential impacts on sea turtles and marine mammals during construction and operation of the project. The DEIS and Biological Assessment contain language indicating that the current barge traffic represents a threat due to vessel strikes, but no supporting data are provided regarding the number and severity of strikes associated with fuel barge traffic. In addition, as part of the avoidance and minimization measures, additional information should be provided regarding implementation of NMFS's guidelines for vessel strike avoidance, reporting and in-water construction.

Finally, information regarding sighting logs, environmental monitoring, and other management measures should be provided.

4. The DEIS refers to the need to develop a lighting plan. A detailed lighting plan for the offshore terminal and any nearshore areas of the existing plant that may require additional lighting are required to inform a complete assessment to ESA-listed species. The plan should consider photopollution impacts to various life stages of sea turtles. Hawksbill turtles have been reported to nest on pocket beaches in Jobos Bay, and Nassau grouper may congregate around the offshore platform to feed and be susceptible to impacts from impingement or contaminant discharge.

5. A thorough alternatives analysis as detailed previously in this letter.

6. A thorough analysis of thermal effects, both hot (from the discharge of process water) and cold (from the pipeline) on ESA-listed species and their habitat. The DEIS mentions and dismisses these effects, but doesn't provide detailed analyses to support the stated conclusions. Specifically, the Biological Assessment should assess potential impacts to corals immediately adjacent to the pipeline (cooling effects) as well as potential impacts of warm water discharge on coral colonies in the immediate vicinity of the platform.

7. Information regarding the cumulative impacts of the continued operation of the seawater intake and outfall of the existing Aguirre plant, combined with the proposed project, should be presented. Because effects of the existing operation will add to the effects associated with entrainment and impingement on coral and Nassau grouper larvae, and possibly queen conch larvae, a discussion of all the cumulative impacts of the project, including the continued operation of the plan, needs to be included.

8. A detailed analysis, including quantification, of impingement and entrainment impacts to corals, sea turtles, and Nassau grouper life stages, should be included in the DEIS and BA. This information should be provided for all intakes to be in operation during the construction and operation phases of the project.

9. The analysis of effects to ESA-listed species and their habitat should include consideration of potential impacts to navigation and the potential for increases in accidental groundings of project vessels and recreational vessels as these try to avoid any safety or warning zones. The number, size, and draft of vessels to be used during the construction of the project should be included. The potential for displacement of recreational vessels due to the project is noted in several sections of the DEIS, but no estimates are provided regarding the number and size of vessels that typically utilize the project area. This information should be provided, along with typically navigation routes and sites visited in the project area, in order to assess the potential for changes in navigation routes and associated increases in the potential for accidental groundings.

10. The details of sediment and erosion control and stormwater management measures both in-water and on land should be included in the FEIS and Biological Assessment. This information is necessary to assess potential sediment and stormwater impacts to ESA resources and the adequacy of proposed minimization measures. The DEIS refers to the need for a National Pollutant Discharge Elimination System permit (NPDES) from the

U.S. Environmental Protection Agency (EPA) for stormwater management, construction on a terrestrial area that is greater than 1.0 acre, and seawater intake and discharges. It is not adequate for our analysis of effects to rely on future NPDES permit decisions to protect ESA resources from sediment, stormwater, and seawater intakes and outfalls.

11. An estimated construction time line for each alternative is necessary. The time line should include details of the duration of temporary impacts associated with each alternative NMFS recommend be considered further, as well as the total time required for each stage of the project.

12. NMFS continues to believe that the use of sediment data from NOAA's National Status and Trends Program is not sufficient on its own, given that any of the in-water installation methodologies will result in sediment resuspension and transport. NMFS recommends that sediment sampling specific to the project and the preferred alternative and preferred routes be conducted. The sampling can target the constituents of concern that were found in elevated concentrations in NOAA's samples, as identified in the DEIS. Depending on the results, the construction design of the project should include specific measures to minimize potential impacts of sediment resuspension and transport to ESA resources.

13. An analysis of the impacts to ESA resources of various water quality constituents that will be released into the marine water column during construction or operation of the project should be part of the effects analysis in the Biological Assessment including:
    a. Nitrogen used to purge and inert the offshore facility in start and stop.
    b. Sodium hypochlorite that will be used as a biocide for the system at the platform, especially considering that the in-system residual chlorine will exceed EPA standards for marine waters.
    c. Sanitary discharges or excess chlorine from treatment of wastewater.
    d. Ballast water and blowdown water.
    e. Brine discharge from FSRU vessels.

14. An environmental sampling plan should be designed and implemented for the construction and operation phases of the project and should include contingency measures should impacts to ESA resources be observed or should minimization and mitigation measures prove inadequate to reduce the extent of impacts to ESA resources. The details of this plan should be part of the minimization and mitigation measures included in the DEIS and Biological Assessment to reduce potential impacts to ESA resources associated with the final location, design, and construction methods selected for the project.

15. An analysis of water quality sampling data, including turbidity levels, from the project area should be included in the DEIS and Biological Assessment. These data should be used to set a threshold for the monitoring program to be implemented during construction of the pipeline and platform to ensure all terrestrial and in-water sediment control measures are adequate and functioning properly.

Please be aware that, due to the lack of quantification of potential project impacts to ESA-listed species and their habitat in the DEIS and Biological Assessment, NMFS is unable to proceed

with ESA Section 7 consultation for the project at this time. In several sections of the DEIS, it is stated that details of some aspects of project design will be included in the final EIS document and that the mitigation plan and other minimization measures will be developed in cooperation with NMFS and other agencies by the September 29, 2014, deadline to submit comments regarding the DEIS. This is because FERC wants to finalize the EIS by December 2014. Please note that this is not in keeping with ESA consultation requirements and the time requirements for formal consultation. At this time, because of the preferred alternative and the direct impacts to ESA-listed corals and their designated critical habitat, NMFS has determined that formal consultation is necessary, which is also what FERC requested in their letter dated August 14, 2014. Section 7 allows NMFS up to 90 days to conclude formal consultation with your agency and an additional 45 days to prepare our biological opinion once NMFS receives all the information necessary to initiate consultation. The ESA requires that, after initiation of formal consultation, the federal action agency must make no irreversible or irretrievable commitment of resources that limits future options. This practice ensures agency actions do not preclude the formulation and implementation of reasonable and prudent alternatives that avoid jeopardizing the continued existence of endangered or threatened species, or destroying or modifying their critical habitats.

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